

REMARKS

Claims 1 - 20 remain active in this application. amendment of claim 14 has been requested to improve antecedent language correspondence. No new matter has been introduced into the application. The indication of allowability of claims 2 - 13 and 15 - 20 is noted with appreciation.

Claims 1 and 14 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claim 1 of copending (CIP) application 11/018,920. This sole ground of rejection in this application is respectfully traversed.

Claim 1 of copending application 11/018,920, now allowed, reads as follows (emphasis added):

1. A two-stage power converter, comprising:
 - a) a first regulator stage providing an adjustable bus voltage V_{bus} :
 - b) a second regulator stage receiving the bus voltage V_{bus} and providing an output current;
 - c) *a current sensor for sensing an output current of the second regulator stage;* and
 - d) *a control circuit responsive to an output of the current sensor, wherein the control circuit controls steady state operation of the first regulator stage such that the bus voltage V_{bus} increases with increasing output current.*

The recitations of paragraphs c) and d) thus clearly recite a current sensor and a control circuit for controlling the output voltage of the first regulator stage responsive to the output of the current sensor.

In sharp contrast therewith, relevant recitations of claims 1 and 14 of the present application (including the amendments requested above) are as

follows, with emphasis added:

(Claim 1) A voltage regulator for an electrical device having a *plurality of operating modes having differing current consumption*, said voltage regulator comprising

a regulator stage having an input for receiving an input voltage, and

a V_{bus} supply regulator stage having an input for *receiving information corresponding to an operational mode* of said electrical device and supplying a voltage corresponding to said operational mode or said current consumption *as said input voltage* to said regulator stage such that said input voltage is larger for higher steady state current consumption and lower for lower steady state current consumption.

and (Claim 14)

...a load having a *plurality of operating modes having differing current consumption*, and a voltage regulator, said voltage regulator including

a regulator stage having an input for receiving an input voltage, and

a V_{bus} supply regulator stage having an input for *receiving information corresponding to an operational mode or current consumption* of said ~~electrical device~~ load and *supplying a voltage corresponding to said operational mode or current consumption as said input voltage* to said voltage regulator stage such that said input voltage is larger for higher steady state current consumption and lower for lower steady state current consumption.

While the "regulator stage" in claims 1 and 14 of the present application corresponds to the second stage regulator of claim 1 of the copending application and the " V_{bus} supply regulator stage" of present claims 1

and 14 corresponds to the first stage regulator of claim 1 of the copending application, there is no recitation of a current sensor or a controller in claim 1 or 14 and the voltage supplied by the V_{bus} supply regulator stage is controlled *responsive to information concerning the operational mode of the load* which has a corresponding current consumption but which is not necessarily detected or measured by a current sensor. Therefore, not only are the present claims directed to a different combination of elements distinct from the combination recited in claim 1 of the copending application but the explicitly recited function of recited elements is also different and patentably distinct between the two applications.

In particular, the present invention exploits the fact that many loads such as microprocessors will exhibit much different current requirements in different operational modes (e.g. a given sleep state as contrasted with other sleep states or a work state) but that the steady state current drawn in any given operational mode may not significantly vary while the load is operating in that mode. Therefore, the present invention provides estimation of the steady state current requirements from information indicating the operational mode (or a corresponding current consumption) with sufficient accuracy for control of the V_{bus} supply voltage regulator stage and avoids a need for (but comprehends) measurement of actual current output from the (second) regulator stage or current drawn by the load or control in response to the output of a current sensor although the possibility of load current measurement as a perfecting feature of the present invention is disclosed.

This difference is operationally as well as structurally significant since a signal indicating the operational mode will usually be available at the time that operational mode is actually entered (or even

before the operational mode is entered from a signal controlling the operational mode or indicating initiation of the change) as discussed at pages 17 and 18 of the present application whereas, when load current changes significantly such as when switching between operational modes, current sensing necessarily involves separate delays for the load current (e.g. corresponding to a changed operational mode) to be developed (given the parasitic inductance and capacitance in the circuit and hardware latency in switching to and from sleep states), for that current to be sensed and for a signal reflecting the altered load current to be propagated to the V_{bus} regulator stage although current sensing and/or provision of separate or particular controls of the first regulator stage may also provide V_{bus} voltage positioning which may result in increased overall efficiency, as is appropriate to the status of U. S. patent application 11/018,920 being a continuation-in-part of the present application. This significant difference is not merely an obvious variation of the subject matter claimed in the copending application but a significantly different basic approach to voltage regulator control and claims 1 and 14, directed thereto, are significantly different from the claims in the copending application both in the combination of elements respectively claimed and the operation of those elements.

Therefore, it is respectfully submitted that no basis exists for or which supports the present sole ground of rejection, even in regard to claims 1 and 14 as presently rejected. However, it is possible that the Examiner may have been confused by some language in claims 1 and 14. Specifically, both claims 1 and 14 recite that the electrical device or load has "a plurality of operating modes having differing current consumption" and the recitation of "information corresponding to an operational mode or current

consumption of said electrical device" carries forward that antecedent language since information concerning an operational mode would also infer a general level of current consumption in view of the prior recitation noted above (while not requiring or logically inferring current sensing or use of a separate controller as claimed in the copending application). It is clear from the statement of this sole ground of rejection, however, that the Examiner has improperly inferred current sensing and separate control from the latter recitation of "or current consumption" noted above notwithstanding the fact that those elements are not recited in claims 1 or 14 whereas the copending, continuation-in-part application claims a different and more extensive combination of elements and recites distinct functions for those elements.

Accordingly, it is clearly seen from the foregoing that the sole ground of rejection in this application is clearly in error in regard to claims 1 and 14 as rejected. Accordingly, reconsideration and withdrawal of this sole ground of rejection is respectfully requested.

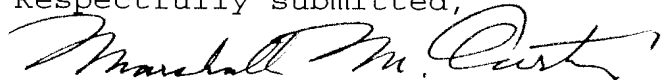
It is also respectfully submitted that the entry of the above-requested amendments is well-justified. The scope of the claims remains unchanged and no new issues could possibly be raised by the entry of the requested amendments. Moreover, the amendments are confined to matters of form for which entry is provided under 37 C.F.R. §1.116. Further, entry of the above-requested amendments is well-justified as placing this application in *prima facie* condition for allowance.

Since all rejections, objections and requirements contained in the outstanding official action have been fully answered and shown to be in error and/or inapplicable to the present claims, it is respectfully submitted that reconsideration is now in order under the provisions of 37 C.F.R. §1.111(b) and such

reconsideration is respectfully requested. Upon reconsideration, it is also respectfully submitted that this application is in condition for allowance and such action is therefore respectfully requested.

If an extension of time is required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,



Marshall M. Curtis
Reg. No. 33,138

Whitham, Curtis, Christofferson & Cook, P. C.
11491 Sunset Hills Road, Suite 340
Reston, Virginia 20190

(703) 787-9400
Customer Number: **30743**